



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|--------------------|
| 10/584,407 | 06/26/2006 | Paul Joseph Brooks | 0076091-000008 | 9864 |
| 21839 | 7590 | 12/23/2010 | EXAMINER | |
| BUCHANAN, INGERSOLL & ROONEY PC POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404 | | | | KHATRI, PRASHANT J |
| ART UNIT | | PAPER NUMBER | | |
| 1783 | | | | |
| NOTIFICATION DATE | | DELIVERY MODE | | |
| 12/23/2010 | | ELECTRONIC | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com
offserv@bipc.com

| | | |
|------------------------------|------------------------|---------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/584,407 | BROOKS, PAUL JOSEPH |
| | Examiner | Art Unit |
| | PRASHANT J. KHATRI | 1783 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 08 November 2010.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1,4,6-10,14-18 and 21 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1,4,6-10,14-18 and 21 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

In response to RCE filed 10/4/2010. Claims 1, 4, 6-10, 14-18, and 21 are pending.

Claim 1 was amended. Claim 22 was cancelled. Examiner notes that the claims that will be examined are those filed 11/8/2010.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/4/2010 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 4, 6-10, 14-18, and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 1 recites the limitations of "high absorbency and emissive characteristics", "low absorbency characteristics", and "high transmissive characteristics". It is not clear

Art Unit: 1783

what would be considered high or low in regards to the above material characteristics and in terms of the application for the film for an antenna. Concerning claims 7-8 and 15-18, it is noted that silicon oxide, silicon oxynitride, and silicon nitride are considered to be metalloids or semi-metallic materials. Examiner notes that Applicant has recited in claim 1 that the thermal control film is to be "metal free" which contains non-metallic layers. Given that Applicant has argued that metalloids or semi-metallic materials are considered to be metal-based, it is not clear how the thermal control film would remain metal free if silicon nitrides and silicon oxides are substituted. Claims 4, 6-10, 14-18, and 21 are further rejected as being dependent upon claim 1. Clarification is requested.

5. Claim 1 also recites the limitation that at 2.5 microns to 50 microns, the interference filter has high absorbency and emissive characteristics and also has low absorbency characteristics in the solar spectrum range from 200-2500 nm. Examiner notes that 2.5 microns is the same as 2500 nm. As such, it is not clear how at 2500 nm or 2.5 microns, the film simultaneously has low absorbency and high absorbency. Clarification is requested.

6. Claim 21 recites the limitation "the spacecraft" in the last line of the claim. There is insufficient antecedent basis for this limitation in the claim. Furthermore, it is not clear whether the antenna is on a spacecraft or what scope the claim is intending to cover. Clarification is requested.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 4, 6, 9-10, 14, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rogers et al. (**US 4479131**) in view of Jonza et al. (**US 5882774**) with evidence provided by 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet (**Hereafter “Product Sheet”**).

9. Rogers et al. disclose a thermal protective shield for antenna reflectors. Concerning claim 1, Rogers et al. disclose that the thermal protective shield must be transparent to RF energy for example from 11-15 GHz, high solar reflectance which is about 54% and low absorption which is about 44%, high thermal emittance from the front or solar facing side, low thermal emittance from the back of the back or reflector facing side and low solar transmittance of about 2% through to the antenna (**col. 2, lines 44+**). The thermal protective shield is positioned in front of the RF transmitter or receiver by means of an adhesive or other conventional means (**FIG. 1; col. 2, lines 5+**). The conditions are met through several different embodiments including one embodiment (**FIG. 6**) that is a multilayered semiconductor optical coating that acts as an interference filter to achieve different optical and thermal characteristics wherein the multilayered coating is disposed upon a polyimide substrate (**cols. 5-6, lines 59+**). While it is noted that Rogers et al. are silent to the solar spectrum range and IR range

as presently claimed, the disclosure of Rogers of a multilayered semiconductor optical coating that tailored to achieve different optical and thermal characteristics would motivate one of ordinary skill in the art to design the appropriate optical stack that has the presently claimed characteristics. Examiner also notes that the solar radiation spectrum consists of five regions: IR, visible, UVA, UVB, and UVC wherein IR is further divided into IR-A, IR-B, and IR-C. As such, one of ordinary skill in the art would have been able to design a stack that is capable of reflecting and re-radiating in the presently claimed wavelength ranges. However, Rogers et al. are silent to the use of a metal-free thermal control film.

10. Jonza et al. disclose a multilayer optical film (**abstract**). Concerning claims 1, 4, and 6 Jonza et al. disclose the multilayer optical film allows for construction of mirrors and polarizers wherein said multilayer optical film are comprised of alternating layers of PEN and coPEN wherein the PEN and coPEN for example, and have different refractive indices (**FIG. 1b; col. 2 bridged to 3, lines 63+; col. 5, lines 28+; col. 10-12, lines 31+**). Examiner notes that the desired refractive index relationships can be established by combining a first material that is crystalline or semi-crystalline with a second material that is crystalline, semi-crystalline, or amorphous by stretching during or after film formation, extruding, or coating (**col. 16-17, lines 39+**).

Jonza further discloses that optical properties such as reflectance and polarization vary depending upon the stretching as the stretching goes from uniaxial to biaxial stretching (**col. 3, lines 1+; col. 5, lines 28+; col. 10-12, lines 31+**). Specifically, it is noted that Jonza discloses stretch rate, stretch ratio, and stretch

temperature are among the variables that one of ordinary skill in the art could adjust to form the desired optical properties (**col. 18, lines 1+**).

Regarding claim 4, it is noted that since the material as disclosed by Jonza is comprised of the materials as presently claimed in claim 1 (i.e. alternating high/low refractive indices non-metallic layers), the material would be intrinsically flexible. Concerning claims 9-10, Examiner notes that optical properties are known within the art to be strongly influenced by optical thicknesses which is a parameter based upon the physical thickness of each layer. Given the above disclosure, one of ordinary skill in the art by routine experimentation would be able to determine the thickness of the total stack depending upon the desired optical characteristics. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious to one of ordinary skill in the art to form the appropriate thickness depending upon the desired optical properties.

As evidence by the Product Sheet which discloses a mirror film that is comprised of a film that is similar to that used in the present invention and in Jonza and has wavelength transmission in the near wavelength range as that used in the present invention and an optical reflectivity in the visible light above 95% (**Table**). The mirror film is metal free and thus is non-corroding and non-conductive (**Table**). While it is noted that the mirror film of the Product Sheet is silent to some of the presently claimed material characteristics, it is noted that the disclosure of Jonza explicitly recites that optical properties are dependent upon the processing and optical thickness parameters. As such, it is clear that one of ordinary skill in the art, in order to produce the desired

optical performance of a mirror film, would by routine experimentation have produced the presently claimed material properties depending upon the application. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Concerning the present limitation of the film stack allowing heat to be dissipated, it is noted that since the combined disclosure appears to be the same as that presently claimed, the film would intrinsically allow for heat to be dissipated by means of the active face. The resultant film as shown by Jonza is metal-free and would thereby meet the limitations of claim 1.

Concerning claim 21, it is noted that the application of a liquid coating to form the film stack is considered a product-by-process given that the resultant film forms a multilayer stack wherein the material limitations can be met by either process. Although Jonza et al. does not disclose applying the interference stack as a liquid onto the substrate, it is noted that “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process”, *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Further, “although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product”, *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). See MPEP 2113.

Therefore, absent evidence of criticality regarding the presently claimed application as a liquid coating and given that Jonza meets the requirements of the claimed composite, Jonza clearly meet the requirements of present claim 21.

11. All of the elements were known within the art. The only difference is a single disclosure containing all of the presently claimed elements. Rogers et al. disclose a thermal protective shield for antenna reflectors. However, Rogers et al. are silent to the use of a metal-free thermal control film. Jonza et al. disclose a multilayer optical film that can be used in constructing mirrors containing only polymeric material. The mirrors are formed by varying the stretch ratio (i.e. uniaxial stretching to biaxial stretching), set temperatures, and other known parameters to form the desired optical performance properties. While it is noted that the mirror film of the Product Sheet is silent to some of the presently claimed material characteristics, it is noted that the disclosure of Jonza explicitly recites that optical properties are dependent upon the processing and optical thickness parameters. As such, it is clear that one of ordinary skill in the art, in order to produce the desired optical performance of a mirror film, would by routine experimentation have produced the presently claimed material properties depending upon the application and thereby allow for heat to be dissipated. Further, it is noted that such a mirror film is metal free and thus, will not corrode in corrosive environments. Given that the multilayer stack of Rogers et al. serves as a interference stack for controlling the thermal and optical characterstics of the shield and Jonza with evidence from the Product Sheet disclosing a polymer stack that can be formed into a mirror film that reflects certain wavelengths, it would have been obvious to one of ordinary skill in

the art to substitute the interference film of Jonza with the interference film of Rogers et al. in order to increase resistance to corrosion while maintaining the desired optical properties.

12. Claims 7-8 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rogers et al. (**US 4479131**) in view of Jonza et al. (**US 5882774**) with evidence provided by 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet (**Hereafter “Product Sheet”**) as applied to claims 1 and 14 above, and further in view of Iacovangelo et al. (**US 6587263**).

13. Rogers et al. and Jonza disclose the above; however, prior art is silent to the filter comprising a silicon-based material.

14. Iacovangelo et al. disclose optical solar reflectors comprising a substrate, bond layer coating, reflective coating, and radiative layer (**abstract**). Concerning claims 7-8 and 15-16, Iacovangelo et al. disclose the radiative layer is comprised of silicon oxide, silicon nitride, and silicon oxynitride in which the refractive index profile can be modulated to control the amplitude, bandwidth, and wavelength of the rejection bands (**abstract; col. 2, lines 35+**). The thickness of this layer is from 10 to 25 microns (**col. 2, lines 41+**). As shown by Iacovangelo, the radiative layer allows for improved emissivity and absorbency in wavelengths from 200 nm to 2500 nm and far infrared regions (**col. 2, lines 42+**). Regarding the limitation of a plurality of tiles, Iacovangelo et al. disclose the radiative layer is deposited to plates having a reflective layer used in spacecrafts (**col. 4, lines 50+**). The radiative layer comprising such materials allows for

improved interfacial CTE matching during thermal cycling, improved optical performance at different wavelengths, and thermal properties (**col. 2, lines 35+**).

15. All of the elements were known in the art. The only difference is a single disclosure containing all of the presently claimed elements. Rogers et al. and Jonza disclose the above; however, prior art is silent to the filter comprising a silicon-based material. Iacovangelo et al. disclose optical solar reflectors comprising a substrate, bond layer coating, reflective coating, and radiative layer. Given that Iacovangelo et al. disclose the radiative layer comprising silicon oxide, silicon nitride, and silicon oxynitride has improved optical performance in certain wavelengths during thermal cycling, it would have been obvious to one of ordinary skill in the art to use the materials of Iacovangelo et al. in order to improve optical performance in the desired wavelengths.

Response to Arguments

16. Applicant's arguments, see p. 5, filed 10/4/2010, with respect to objection of claim 22 have been fully considered and are persuasive. The objection of the above claim has been withdrawn.

17. Applicant's arguments, see pp. 5-6, filed 10/4/2010, with respect to the 35 USC 112, 1st paragraph rejection of claims 1, 4, 6-10, 14-18, and 21-22 have been fully considered and are persuasive. The rejection of the above claims has been withdrawn.

18. Applicant's arguments filed 10/4/2010 regarding the 35 USC 112, 2nd paragraph rejection of claims 1, 4, 6-10, 14-18, and 21 have been fully considered but they are not persuasive. Applicant asserts the terms "high absorbency and emissive characteristics", "low absorbency characteristics", and "high transmissive characteristics" are considered definite since "high absorbency" would have a value closer to 3 AU and "low absorbency" would be at a value closer to 0. The emissive characteristics are from a shiny mirror for a low emissivity to a blackbody for high emissivity. Examiner respectfully disagrees and notes that the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Examiner notes that within the specification, Applicant has only recited a 3M™ Multilayer sheet having similar properties as the Product Sheet cited above in the wavelength ranges disclosed by the Product Sheet and not within the presently claimed ranges. Given that the specification provides no examples showing any of the absorbency values or any examples wherein the film is a black body or a shiny mirror and the Product Data Sheet only discloses a film that is similar to that found within the specification at wavelength ranges different from that presently claimed, it is not clear what is considered to be "high" or "low" with respect to the presently claimed multilayer stack. As such, the rejection is maintained.

19. Applicant's arguments, see pp. 8-12, filed 10/4/2010, with respect to the 35 USC 103(a) rejection of claims 1, 4, 6, 9-10, 14, and 21-22 over Kuffer in view of Jonza with evidence from Billings, Pauly, and the Product Sheet and 35 USC 103(a) rejection of

claims 7-8 and 15-18 over the above further in view of Iacovangelo have been fully considered and are persuasive. The rejection of the above claims has been withdrawn. However, it is noted that Jonza, the Product Sheet, and Iacovangelo are still considered to be applicable to the present claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PRASHANT J. KHATRI whose telephone number is (571)270-3470. The examiner can normally be reached on M-F 8:00 A.M.-5:00 P.M. (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571) 272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/584,407
Art Unit: 1783

Page 13

/Patricia L. Nordmeyer/
Primary Examiner, Art Unit 1788

PRASHANT J KHATRI
Examiner
Art Unit 1783